What is claimed is:

1. A multi-beam cellular communication system for providing last-mile communication to a large number of users in a communication cell comprising:
   A) a plurality of multi-beam radio transceivers, each transceiver comprising at least one multi-beam antenna configured to transmit a plurality of narrow beam radio beams, each beam having a divergence of less than 10 degrees with each beam transmitting information to a plurality of some of said large number of users,
   B) a large number of users transceivers, each user transceiver comprising at least one transceiver comprising at least one narrow beam antenna directed toward one of said plurality of multi-beam radio transceivers and configured to transmit a narrow beam radio beam having a divergence of less than 10 degrees, and
   C) a trunk line means for providing communication between each of said multi-beam radio transceivers and a telephone central switching office;

   wherein narrow beam width communication is provided between said plurality of multi-beam transceivers and said very large number of users permitting an available radio bandwidth to be utilized many times in said communication cell.
2. A system as in Claim 1 wherein said at least one multi-beam antenna comprises a pair of multi-beam antennas, one configured to transmit radio beams and another one to receive radio beams.
3. A system as in Claim 2 wherein each pair of multi-beam antennas is so configured such that beams transmitted or received by each of said pair of multi-beam antenna has a divergence of about 5 degrees.
4. A system as in Claim 2 wherein each of said user transceivers is configured to transmit radio beams having a divergence of about 5 degrees.
5. A system as in Claim 1 wherein a first portion of said plurality of multi-beam radio transceivers is arranged in groups of 6 to produce a first set of beams to provide a full 360 degrees of angular coverage.
6. A system as in Claim 5 wherein a second portion of said plurality of multi-beam radio transceivers are arranged in a second group of 6 to produce a second set of beams crossing said first set of beams.

7. A system as in Claim 1 and further comprising a wireless millimeter wave trunk line providing communication between said cell and a telephone communication office, said system further comprising:

   A) a plurality of cellular base stations one of said base stations serving said communication cell and other base stations serving other communication cells, each of said base stations comprising:

      1) a high frequency transceiver for communicating with other base stations and the communications office as a part of said trunk line at a trunk line frequency higher than 60 GHz, said high frequency transceiver having up-converting equipment for converting said cell phone radio frequency to said trunk line frequency and down-converting equipment for down converting said trunk line frequency to said cell phone frequency.

   B) at least one communications telephone office high frequency transceiver operating as a part of said trunk line in communication with said plurality of high frequency transceivers and the communications office at a frequency higher than 60 GHz.

8. A system as in Claim 7 wherein each of said base station transceivers is configured to transmit to and receive from a second site through atmosphere digital information at rates in excess of 1 billion bits per second during normal weather said first transceiver comprising an antenna producing a beam having a half-power beam width of about 2 degrees or less.

9. A system as in Claim 7 wherein one of said high frequency transceivers are configured to transmit at frequencies in the range of about 92.3 to 93.2 GHz and to receive information at frequencies in the range of about 94.1 to 95.0 GHz.

10. A system as in Claim 7 and further comprising a back-up transceiver system operating at a data transmittal rate of less than 155 million bits per second configured continue transmittal of information between said first and second sites in the event of abnormal weather conditions.

11. A system as in Claim 10 wherein said backup transceiver system is a microwave system.

12. A system as in Claim 10 wherein said backup transceiver system is configured to operate in the frequency range of 10.7 to 11.7 GHz.
13. A system as in Claim 10 wherein said backup transceiver system is configured to operate in the frequency range of 5.9 to 6.9 GHz.
14. A system as in Claim 10 wherein said backup transceiver system is configured to operate in the frequency range of 13 to 23 GHz.
15. A system as in Claim 7 wherein both said high frequency transceivers are equipped with antennas providing a gain of greater than 40 dB.
16. A system as in Claim 15 wherein at least one of said antennas is a flat panel antenna.
17. A system as in Claim 15 wherein at least one of said antennas is a Cassegrain antenna.
18. A system as in Claim 15 wherein at least one of said antennas is a prime focus parabolic antenna.
19. A system as in Claim 15 wherein at least one of said antennas is an offset parabolic antenna.
20. A system as in Claim 7 wherein said high frequency transceivers are capable of transmitting and receiving at rates in excess of 1 billion bits per second and the antennas of both systems are configured to produce beam having half-power beam widths of about 0.36 degrees or less.
21. A system as in Claim 7 wherein one of said high frequency transceivers are configured to transmit at frequencies in the range of about 71-76 GHz.
22. A system as in Claim 7 wherein one of said high frequency transceivers are configured to transmit at frequencies in the range of about 81-86 GHz.

23. A multibeam communication lens antenna for simultaneous transmission of a plurality of radio signals, comprising:
    A) a linear array of antenna elements,
    B) a sandwich structure comprised of:
        1) a top conducting plate,
        2) a thin dielectric plate, and
        3) a bottom conducting plate,

C) a plurality of antenna lens feeds in electrical contact with said top conducting plate,

D) a plurality of bootlace elements, each bootlace element defining a bootlace length and connecting one antenna of said linear array of antenna elements to one lens feed of said plurality of lens feeds,

E) a plurality of transceiver lens feeds in electrical contact with said top conductor plate, and

F) a plurality of electronic to radio transceivers, each one of said electronic to radio transceivers in communication with one lens feed of said plurality of lens feeds and also in electronic communication with a single line of a plurality of communication lines forming a part of a communication network,

said sandwich structure being shaped such that radio signals emitted by each of said radio transceivers are broadcast by said linear array of antennas in a predetermined direction in a beam having a divergence of less than 10 degrees.

24. A multi-beam antenna as in Claim 23 wherein said plurality of electronic to radio transceivers is more than ten transceivers and wherein said sandwich structure is shaped such that signals from each of said more than 10 transceivers are broadcast by said array of antenna in a direction different from any other of signal of said 10 transceivers.

25. A multi-beam antenna as in Claim 23 wherein the length of each of said bootlace elements is substantially equal to the length of each other of said bootlace elements.

26. A multi-beam antenna as in Claim 23 wherein said communication network is an ethernet.

27. A multi-beam antenna as in Claim 23 wherein said antenna is configured to transmit radio signals at frequencies in the range of about 5.725 GHz to 5.825 GHz.

28. A multi-beam antenna as in Claim 23 wherein said antenna is configured to receive radio signals in the range of about 5.725 GHz to 5.825 GHz.